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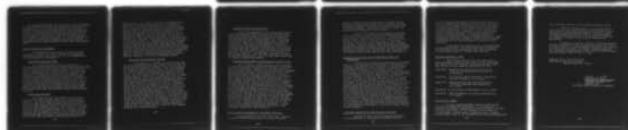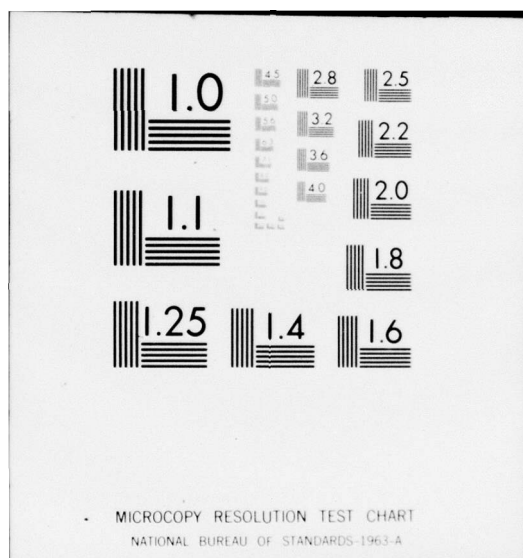   APR 52   S R ASPINALL
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OFFICE OF NAVAL RESEARCH

LONDON

EUROPEAN SCIENTIFIC NOTES.

Vol. 6, No. 8

S. R. /Aspinall

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AMERICAN EMBASSY   LONDON, ENGLAND

OFFICE OF NAVAL RESEARCH
London

EUROPEAN SCIENTIFIC NOTES

15 April 1952   Vol. 6, No. 8

AMERICAN EMBASSY   LONDON, ENGLAND

MULTICOMPONENT INFRA-RED GAS ANALYZER

At the recent Physical Society Exhibition in
London the Distillers Co. Ltd., of Epsom, Surrey, demon-
strated an infra-red gas analyzer which has been built in
their laboratory to perform the analysis of four components
in a stream of hydrocarbon gases in one of their chemical
plants.

The radiation from a glowing nichrome coil is
collimated by a mirror and allowed to pass through the
sample whose composition is to be determined. The left
and right halves of the beam are then chopped with a modu-
lator which leaves the total transmitted energy constant
while alternating the beams which are transmitted. One of
these two beams is then allowed to pass through a sensitizing
cell while the other goes through either a blank or a com-
pensating cell, after which they are focused on the same
portion of a lead sulphide photoconductive cell. The presence
of a particular gas, propylene for instance, in the sensi-
tizer cell serves to render that half of the beam insensi-
tive to any further propylene in the unknown sample. The
other beam will suffer a reduction in intensity when propy-
lene appears in the unknown. The result of the presence
of propylene will then be to give an electrical signal
from the receiver. Another gas in the unknown will absorb
radiation equally in both beams and give no signal. In
order to analyze successively for a number of components
in the unknown, a series of sensitizer cells is provided
on a rotating drum so that they can be introduced into the

beam one at a time and the resulting signal plotted on a moving paper chart. To the best knowledge of the designer, Mr. J.B. Dymuch, this is the first such infra-red gas analyzer which has been built and operated successfully in the short wavelengths where lead sulphide photoconductive cells are useful. One advantage of this feature is that the optical system uses ordinary glass windows.

A certain amount of interference is found due to the overlapping of infra-red absorption bands, but this has been successfully overcome by the use of additional filter and compensation cells in the two beams.

ELECTROMECHANICAL PARTICLE COUNTER

At the recent Physical Society Exhibition in London was shown an electromechanical particle counter designed for the automatic counting of microscopic particles to an accuracy of about 1%. The 1% tolerance demands that at least 10,000 particles be counted during each experiment, and thus it will be seen that the machine considerably exceeds the accuracies that are obtainable by visual counting. The instrument was developed at the laboratories of C.F. Casella and Co., Ltd. of London.

Optical and Mechanical System

A low voltage light source is used operated with stabilized dc. The microscope condenser is adjusted for Kohler illumination so as to give uniform intensity over the entire field of view. The sample is dispersed over an area of the slide which may be as large as 1 cm^2, and is diluted in such a way as to avoid the excessive agglomeration of particles and still attain the desired number of counts within the available area. Conventional microscope objectives are used, the magnification being chosen according to the size of particle being examined. With a 4 mm objective, particles as small as 1 micron can be counted.

The scanning process is provided by a mechanical movement of the stage driven by a small electric motor. The length of each traversal of the field of view is controlled by a ratchet and pawl device which includes a counter to record the total number of traversals. Limit switches

can be adjusted to control the width of the area examined.
In the focal plane of the objective, slits are arranged
which admit the light onto two photomultiplier tubes. One
of these serves to count the particles which appear in
the main part of the field view. The other photomulti-
plier examines a narrow strip at one edge of the field
of view and is coupled to the first in an anti-coincidence
circuit in such a way as to reject all of those particles
which touch that edge of the field. The particles which
touch the other edge are counted. The speed of operation
is such that if the entire square cm is to be examined,
the machine must run for 7 minutes. An ordinary count
to a $1^o/o$ accuracy can be done in considerably less time.

Electronic System

The pulses from the main photomultiplier, cor-
rected for coincidences from the subsidiary photomulti-
plier, enter a conventional scale of 10 counting circuit.
The output of this circuit is then used to operate a series
of four decade gas discharge counter tubes. These tubes
can be read directly in the decimal system allowing counts
up to 10^5 in one run. A simple switch is provided to re-
store the counter to the zero position.

The whole system is contained in a rack about
$3\frac{1}{2}$ ft high and $1\frac{1}{2}$ ft square and needs only a conventional
ac power supply. The price quoted at present is about
$1200. Work is now under way to develop a pulse height
discriminating circuit with which it should be possible
to distinguish among particles of different sizes and to
record their counts separately.

THERMAL DIFFUSION POTENTIAL

One aspect of the thermodynamics of irreversible
processes, namely the measurement of thermal diffusion
potentials, is being studied by Mr. H.J.V. Tyrrell of
Sheffield University. Mr. Tyrrell has developed apparatus
for making such measurements and has carried out some
experiments which he believes give values of thermal
diffusion potential and hence heats of transfer of the
ions concerned.

In these experiments the cell Pt, H_2/MX/AgCl,
Ag was used where the solutions MX were varied. One
half cell was maintained at one temperature while the
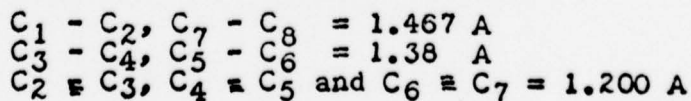other was maintained at a second temperature. The electron

potential across the total cell was measured as a function of concentration of the bridge solution. Derivation of the Nernst equation with respect to temperature and application of the Debye-Huckel theory of electrolytes to the solutions gave an equation which could be readily evaluated provided the assumption was made that dE/dT could be considered approximately equal to $\Delta E/\Delta T$ for small temperature increments. Actually the temperature increment had to be quite large (5°C) in order to obtain a measurable effect of the thermal diffusion potential.

All temperature or concentration dependent terms were gathered together and gave a function which differed from zero (dE^o/dt) by an amount which was defined as the thermal diffusion potential J. Since J is a function both of heats of transfer and of transport numbers of the ions, a plot of this function vs. concentration may be made to increase, decrease, or remain constant depending upon the relative mobilities of the ions in the solution. Thus the plot for KCl was found to be quite constant whereas solutions of HCl and KCl·KOH both showed variation with concentration. The Onsager theory gives this potential as a function of ordinary thermodynamic quantities and the heats of transfer Q^*. Mr. Tyrrell hopes to evaluate these latter quantities which are quite important in transport phenomena and ion hydration effects.

DIRECT EVIDENCE FOR FREE INTERNAL ROTATION OF METHYL GROUPS

Precise X-ray data obtained by Professor Cox and Dr. Jeffrey at Leeds provide direct experimental evidence that the internal rotation of the methyl groups in dimethyl triacetylene is essentially free. Careful evaluation shows that the electron density distribution associated with the hydrogen atoms is a circle within experimental error, i.e., there are no preferred positions (potential energy minima) during the rotation of the methyl groups. This result is consistent with similar conclusions derived previously for dimethyl acetylene from thermodynamic and spectroscopic arguments.

The carbon-carbon bond lengths provide yet another striking example of a conjugated system in which the single bonds are greatly shortened while the double bonds are of the usual length. They are as follows:

$$C_1 - C_2, \; C_7 - C_8 = 1.467 \; A$$
$$C_3 - C_4, \; C_5 - C_6 = 1.38 \; A$$
$$C_2 \equiv C_3, \; C_4 \equiv C_5 \text{ and } C_6 \equiv C_7 = 1.200 \; A$$

## CHEMISTRY AT THE WEIZMANN INSTITUTE OF SCIENCE

The Weizmann Institute of Science at Rehovoth, Israel, was established in part as a tribute to the scientific accomplishments and to the statesmanship of President Weizmann. It receives generous international support and is at present an outstanding research center in the fields of organic chemistry, physical-organic chemistry, and high polymer chemistry. While in its present form the Institute is quite new, its nucleus, the Daniel Sieff Research Institute, has existed since 1934.

The Institute is organized somewhat loosely into departments. These comprise at present organic chemistry, biochemistry, isotope research, polymer research, biophysics, applied mathematics, optics, experimental biology, and a development department. The individual departments vary in size between two and twenty scientists. More than half of the total staff of the Institute is chemists and thus the main activity is in the various chemical fields. Some of the current work in chemistry is briefly described in the following paragraphs. Further details about the organization and work at the Weizmann Institute can be found in Technical Report ONRL-27-52, available from the Technical Information Office, Code 250, Office of Naval Research, Washington 25, D.C.

Photochromy and Thermochromy in Polycyclic Compounds

A large number of theoretical and experimental investigations have been published from the Weizmann Institute dealing with the photochromy and thermochromy at high and low temperatures of numerous polycyclic fused ring systems. Studies made on a number of bianthrones suggest that high temperature photochromy depends on the molecules achieving coplanarity and becoming biradicals. It was shown by Schmidt that the parent molecule, bianthrone, has a "staircase" (non-coplanar) configuration at ordinary temperature. Both low temperatures thermochromy and photochromy appear to involve CO groups. The tentative explanation suggested by Bergmann and Hirschberg for the photochromy of bianthrones and similar ring systems is that a colored ionic species is formed by absorption of radiant energy. A recent experimental observation on xanthylidineanthrone favors this view. The polarization of this molecule in solution was

found to increase strongly upon irradiation.
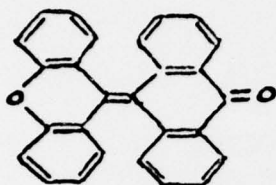
Conjugation in Dibenztropone

Direct experimental evidence was obtained showing that the tropone ring system loses its conjugation and its associated aromatic character upon annulation of benzene rings. The carbonyl infra-red absorption band of 2,3,6, 7-dibenztropone,   , lies at 1660cm^{-1},
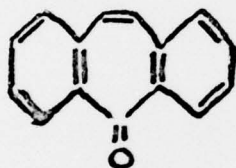
i.e. almost exactly identical with that in benzophenone, and quite different from tropone.

Organic Reactions in the Solid State

The critical conditions controlling some organic reactions occurring in the solid state were recently elucidated by Dr. Schmidt. It has long been known tha trans-cinnamic acid and some of its derivatives undergo a reaction in the solid state under the influence of sunlight; two molecules react and form a cyclobutane ring. Trans-cinnamic acid
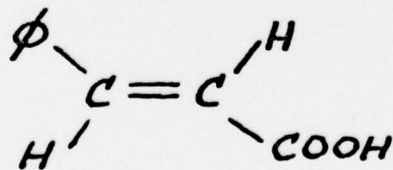
occurs in two solid modifications, α and β, with a transition temperature of about 100°C. X-ray investigation shows that in the α modification the molecules lie parallel.

and oriented in opposite directions while in the β modification they are pointed in the same direction. Under the influence of sunlight the following reactions take place:

$$\phi-C(H)=C(H)-COOH \quad + \quad COOH-C(H)=C(\phi)-H \quad \Bigg\} \longrightarrow$$

α-truxillic acid
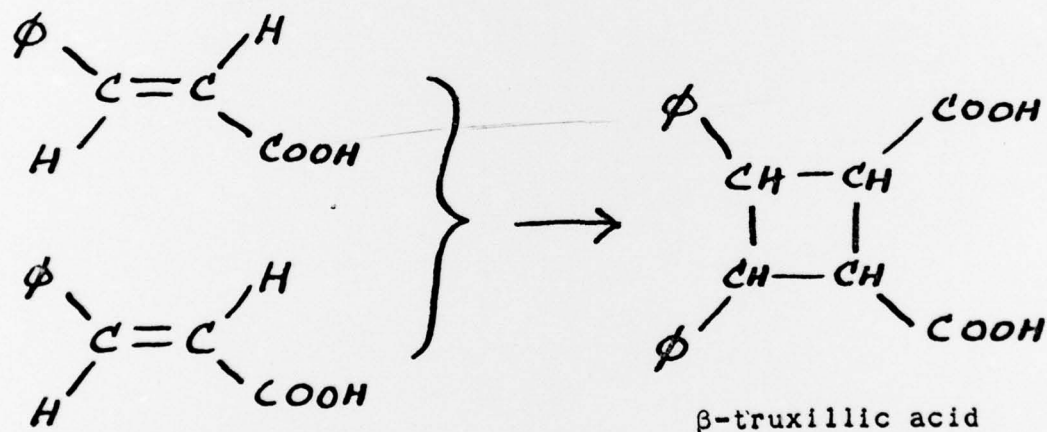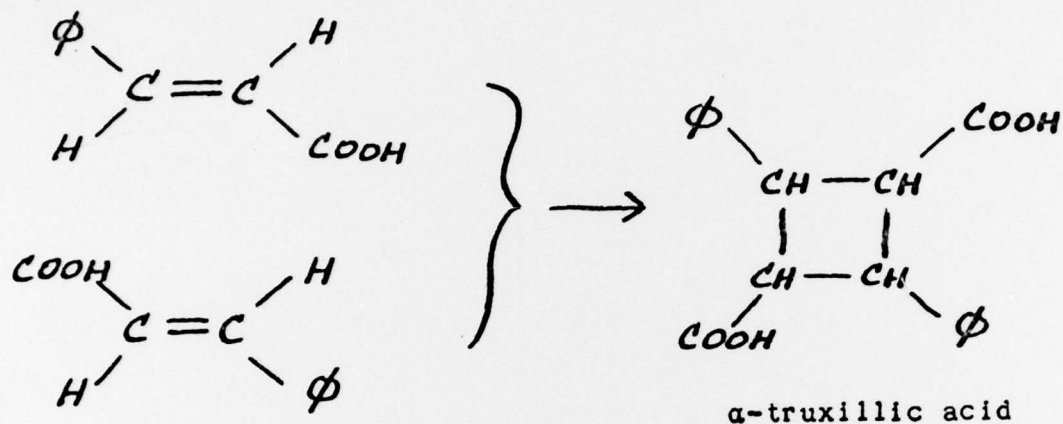
β-truxillic acid

The potassium salt of trans-cinnamic acid has a β type alignment and accordingly yields the potassium salt of β truxillic acid.

Similar investigations were performed on a number of longer chain compounds and it was concluded that in all these substances the distance between parallel chains must be less than about 4A for reaction to occur. In addition, lateral displacement can also prohibit the reaction.

High Polymers

A. Katschalsky and collaborators are applying polyelectrolytes to develop the new field of "mechano-chemistry". Polyelectrolytes consist of long chain molecules carrying polar groups and thus will exist in more or less extended configurations depending on the pH of the system. Cross-linked polyacids have been prepared which are insoluble in the non-ionized state but which will form a gel upon the addition of alkali. Using a simple apparatus in which a mercury column transmits volume changes to a calibrated capillary, pressure-volume curves were obtained at different constant temperatures and at different constant degrees of ionization. This leads to the basic equation of state in mechano-chemistry of the form $PV = RT\alpha(1+B...)$ which is analogous to the ordinary gas law but contains the additional necessary ionization parameter. By integrating throughout a suitable cycle the thermodynamic efficiency of such systems was evaluated and found to be remarkably high. The cycle consisted of two types of steps: an isophoric one in which work is obtained by stretching or compressing macromolecules at constant charge and an isopotential one in which work is obtained at constant thermodynamic potential of the ions.

DEFORMATION STRUCTURES IN SODIUM CHLORIDE

At a recent meeting of the Physical Society in Bristol, P.L. Pratt (Atomic Energy Research Establishment, Harwell) presented results of some of his research on the plastic deformation of transparent single crystals of sodium chloride. Using the Schlieren technique (see Jour. Inst. Metals 80, 409 (1952)) it has been found that sodium chloride deforms at room temperature by a process of simple slip, similar to that in metals, on the (110) plane in the (1$\bar{1}$0) direction, and not primarily by kinking as previously thought. Two types of initial stress-strain curves have been noted, and the deformation characteristic of each type distinguished by using the photo-elastic and Schlieren methods. One strain-hardening curve is a true parabola and the deformation consists solely of slip occurring simultaneously on two mutually perpendicular systems. This result is in agreement with Taylor's theory of strain-hardening. The other type of curve falls below the parabola and beyond a certain point is essentially linear. The abrupt change in the curve is accompanied by the formation of kinks and the cessation of slip on one of the two favorably oriented systems. The inactive slip planes act as the kink planes (since they are perpendicular to the active slip system) and their spacing remains constant

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with increasing deformation. The linearity of the
strain-hardening curve is explained by the observations
that the distance between slip lines of the active system
decreases linearly with increasing strain and each of
these planes undergoes the same amount of slip.

Patches of slip extending across mosaic blocks
are seen in sodium chloride at applied stresses far below
the level usually defined as the yield point. These elements
of slip are visible at a resolved shear stress of 10 gm/mm^2,
while complete slip lines first make their appearance at
the yield stress of 70 gm/mm^2. Pratt believes that the
influence of mosaic boundaries on the deformation process
has been underestimated and that these regions, by acting
as slip barriers, produce the initial steep portion of the
stress-strain curve. In this view, the first dislocations
generated under the low applied stress move across the
blocks until they are stopped at the mosaic boundary.
Upon increasing the stress more and more dislocation sources
randomly distributed are operative and the patches of slip
increase in number and join each other. Finally, at the
stress corresponding to the observed yield stress, the
force on the dislocations is sufficient to drive them across
the crystal past the barriers of the mosaic boundaries.
Beyond this stress, the mosaic boundaries have relatively
little effect. Further information about the Physical
Society meeting, which was on the subject of slip and de-
formation markings in crystals, will be found in Technical
Report ONRL-28-52, available from the Technical Information
Office, Code 250, Office of Naval Research, Washington 25,
D.C.

VOLUME INCREASE IN INTERMETALLIC DIFFUSION

R.S. Barnes of the Atomic Energy Research
Establishment, Harwell, has conducted an investigation of
the Kirkendall effect and related phenomena in metallic
diffusion, extending the work of Da Silva and Mehl (Trans.
AIME 191, 155 (1951)). In a series of experiments on the
interdiffusion of copper-alpha brass and copper-nickel
couples and sandwiches, it was found, in addition to the
well established Kirkendall shift of the interface, that
there is an increase in the volume of the specimens after
diffusion.

The volume increase consists primarily of an
increase in the thickness of the sandwiches (i.e., in the

direction of diffusion) and is proportional initially to the square root of the annealing time but is somewhat less than this rate at longer times. Dimensional increase in directions perpendicular to the diffusion direction becomes significant only after some time (e.g., 36 hours at 1000°C for Cu-Ni with 40 interfaces). The rate of volume increase becomes greater at higher temperatures, and the phenomenon is independent of the atmosphere (hydrogen, argon, or vacuum). It has been established that the magnitude of the increase in volume is proportional to the number of diffusion interfaces.

Supplementary measurements showed a density decrease which was proportional to the square root of the time while the weight remained constant, thus confirming the volume increase. Calculated volume from density measurements after diffusion agreed well with those obtained from direct measurements of linear dimensions.

This increase in volume is caused by the formation of voids in the diffusion zone. Photomicrographs and micro-radiographs have revealed the presence of voids and the fact that they are in the form of polyhedra. While the observations are not conclusive, it appears that each void is a regular (iii) octahedron. An estimate of the total volume occupied by the voids is of the right order to account for the measured increase in volume; and further it has been observed that the size of the voids increases with increase in either time or temperature of diffusion.

X-ray back-reflection Laue photograms taken with a microbeam camera showed the occurrence of polygonization in the diffusion zone, this being evidence of the presence of strain in the lattice as a result of the diffusion process. The polygons were roughly 20μ across and the angle between their axes was about $2°$.

Barnes has concluded, in agreement with some others, that diffusion in metal solid solutions takes place by a vacancy mechanism. The direct atomic interchange and inter-stitial mechanisms are ruled out, at least for the face centered cubic metals in which the interface shift has been observed. The voids formed as a result of diffusion indicate that some of the numerous vacancies condense out of the lattice, and since the voids occur in the portion of the zone where there should be a net gain of vacancies, the behavior is in agreement with the vacancy mechanism. The existence of strain in the diffusion zone is taken as additional evidence in favor of the vacancy theory, the strain being due to the generation of excess vacancies in one region and the loss of them in the other.

The vacancies necessary for the process may be generated on grain boundaries and the edge components of dislocations. They may condense on any of these three sites causing a lattice contraction, or they may coalesce to form voids and produce a volume increase. The lattice strain produced by diffusion can create further lattice defects which act as vacancy sinks or sources, and this might account for the large number of vacancies involved. It is also thought that the strain provides easy diffusion paths due to lattice degeneracy just as grain boundaries permit more rapid atomic flow.

ASSAY OF ENDOCRINE SUBSTANCES

At a meeting of the Society for Endocrinology in London on February 20, 1952, a number of interesting communications were read on methods for the determination of various endocrine substances.

Estimation of ACTH in Blood

Dr. Delphine Parrott from the Department of Chemical Pathology, Kings College Hospital, London, discussed the difficulties of determining the ACTH (Adrenocortico-trophic hormone) activity in blood plasma. She has found that if blood plasma is treated with acidic acetone, four volumes to one of plasma, a precipitate is formed. The supernatant solution can be clarified by centrifugation and the contained ACTH activity be removed by the addition of more acetone to a concentration of 94 per cent. She has found that ACTH can be recovered by this process quite completely from serum for at least one hour after mixing. The rapid destruction of this hormone when added to blood plasma, which was reported by Sayers, has not been found in her experience when the extraction method outlined above was used.

A New Assay for ACTH

Although there are many methods for measuring ACTH activity, none of them seems to be suitable for all purposes. At the National Institute for Medical Research there is a need for a simple assay method which can be used when large amounts of material are available and which will give quite reliable results. H.M. Bruce, A.S. Parkes, and W.L.M. Perry have investigated the utilization of the effect of ACTH in inducing atrophy of the thymus gland of young rats as the basis for such an assay. ACTH in rather large amounts when injected in aqueous solution into five-day old rats does not produce an appreciable effect on

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thymus weight. If, however, the ACTH is suspended in a medium of 5 per cent beeswax in oil, as is done with penicillin, a marked effect of the ACTH on thymus size can be obtained. They conclude that a reasonably satis-factory assay of ACTH can be made by injecting five-day old rats once daily for three days with ACTH in the beeswax-oil vehicle. The rats are autopsied on the 8th day and the thymus removed and weighed. Each assay is conducted at three dose levels and always in conjunction with a known standard. The amount of the unknown material is adjusted so that it is approximately equal in potency to the standard, and the assay is done on litter mates, three of each litter being given the three doses of the standard and the other three the three doses of the unknown. Ten such litters are used for each test. With this method they have been able to obtain an assay with an accuracy of $\pm 30\%$. They have investigated the influence of non-specific stress in stimulating endogenous production of ACTH and find that it is not a significant factor.

New Assay for Thyrotropic Hormone

H. Besford, A.C. Crooke, and Joyce D. Matthews from Birmingham University have devised a new method for the assay of thyrotrophic hormone based on the uptake of P^{32} by thyroid tissue of the chick. They have examined the effect of time relations, dosage, variety of chick, the site of injection, and number of injections on the assay. The best results were obtained when the P^{32} was administered six hours after a single injection of thyro-trophic hormone. The chicks were autopsied two hours following the injection of the P^{32}, the thyroids removed and weighed, and radioactivity of the P^{32} determined. They have found that a group of ten chicks is adequate for a single test. The thyroids of all ten chicks are pooled and their radioactivity determined. Chicks vary-ing in age from hatching to six days were tested and found to give equally good results. Two-day old Black Leghorn and Rhode Island Red cockerels have been found to be the most satisfactory and convenient. Subcutaneous and intraperitoneal injections were found to be equally satis-factory, but the results of intramuscular injections were found to be variable. The least variable responses were found when single injections were given. This method of assay appears to be very simple, to give reproducible results, and to be sensitive. A little as 0.02 Junkmann Schöller units can be detected.

Effect of ACTH on Action of PMS

Drs. R. Brimblecombe, I.D.K. Halkerston, and M. Reiss, from Bristol, report a series of very interesting experiments which show that ACTH inhibits at least certain phases of the action of pregnant mare serum (PMS) when injected into the immature female rat. The effect of PMS in such animals is very largely that of follicle stimulation. When ACTH is injected some days prior to treatment with PMS, follicle stimulation is very much inhibited, but luteinization of the ovarian tissue occurs. If PMS and ACTH are injected simultaneously into adrenal-ectomized rats this effect of ACTH on the PMS action does not occur. Therefore it is presumed to be mediated by some adrenal steroid. ACTH does not influence the action of chorionic gonadotrophin, which in the intact female rat has largely a luteinizing effect.

Adrenal Steroid Effect on Electrolyte Balance in Man

Dr. P. Fourman, Oxford University, has compared the effect of methyl testosterone and desoxycorticosterone acetate on electrolyte balances in a man with untreated adrenal insufficiency. Testosterone and desoxycorticosterone have very similar actions in this respect in normal individuals, but their effect can be shown to be different when tested in such an untreated adrenal-deficient individual. The first test was made with 100 milligrams per day of methyl testosterone given for several days following a control period. After cessation of the testosterone treatment the patient received no treatment for a number of days and then was given desoxycorticosterone at a dosage of 15 milligrams per day for a similar time. Both of these compounds produced nitrogen retention and testosterone caused a retention of potassium to an extent which might be expected in relation to the amount of nitrogen retained, but there was some loss of potassium during the DOCA experimental period. The two steriods did not differ in their influence on chloride, but did differ in their influence on the rise in urinary and fecal potassium and the fall in fecal sodium. These differences in the action of these hormones are obscured in the normal individual. It was emphasized that methyl testosterone was used in these experiments rather than the propionate.

POSSIBLE ROLE OF HISTAMINE IN DECIDUOMA FORMATION

For many years it has been known that trauma to the uterus (electric stimulation, incisions, foreign

bodies, threads) at the correct stage of corpus luteum activity, or following treatment with estrogens and progesterone, provokes a reaction of connective tissue cells to form a deciduoma. The mechanism by which trauma induces this reaction has not been studied.

Dr. M.C. Shelesnyak of the Weizmann Institute, Rehovoth, Israel, is investigating the possibility that this reaction is mediated by histamine. It would seem almost certain that histamine would be released by those uterine injuries which typically result in deciduoma formation. He has found that injection of small amounts of histamine into the uterine lumen of animals, following appropriate endocrine stimulation, causes a marked deciduoma reaction throughout the entire uterus. Current experiments with antihistaminic drugs suggest that they interfere with the decidual reaction and thus support this observation.

COMPARISON OF CHEMICAL AND HISTOCHEMICAL TESTS FOR CHOLESTEROL

The Schultz reaction, which has become an accepted method for the detection of cholesterol in histological sections, has been used by F. Robinson, of the Department of Anatomy, The University of Bristol, to evaluate the physiological condition of the adrenal gland. In her experiments, the adrenal was stimulated by injecting animals with epinephrine or exposing them to cold. A rapid decrease in the stainable (Schultz) cholesterol in the adrenal occurred followed by recovery some hours after the stimulation. In order to check the reliability of the Schultz technique, one adrenal of each animal was examined by the histochemical method and the total cholesterols of the other adrenal determined by chemical methods. No agreement was found between the results of the two methods, that is, in some instances when large amounts of cholesterol were found by chemical method the Schultz reaction was weak, and in some instances when the Schultz reaction was strong rather little cholesterol was detected chemically. The data obtained by histochemical investigation appeared to have a more reasonable correlation with the presumed physiological activity of the adrenal than did the chemical measurements. It is thought that the Schultz reaction may be best suited to the detection of cholesterol which is finally dispersed, and that possibly cholesterol in the form of large crystals is not revealed.

BIOLOGICAL LABORATORY AT THE WEIZMANN INSTITUTE

The newest addition to the Weizmann Institute is the Department of Experimental Biology, headed by

Dr. Isaac Berenblum, formerly of Oxford University, who
plans to conduct a program on growth problems, especially
in relation to cancer. Associated with him is Dr. M.C.
Shelesnyak whose interest is largely in the field of re-
productive physiology. In the near future they expect
to add sections which will deal with cell genetics, and
factors affecting variation in chromosome numbers in
somatic and germinal cells. A laboratory devoted to
enzymology of abnormal tissues is to be established. Other
contemplated activities include a program on the study of
biochemistry of cell particulates, and possibly histo-
chemistry.

A new biological building, one of two envisaged,
is now being erected. This will house animal quarters,
and laboratories for an enlarged staff, and in addition
it will provide space for students and visitors.

TECHNICAL REPORTS OF ONRL

The following reports have been forwarded to
ONR, Washington, since the last issue of ESN. Copies may
be obtained from the Technical Information Office, Code
250, Office of Naval Research, Washington 25, D.C.

ONRL-16-52 "Symposium on the Physical Chemistry of
            Melts at the Royal School of Mines" by
            E. Epremian

ONRL-20-52 "The Nuclear Physics Program at University
            College, London" by S.F. Singer

ONRL-21-52 "Characteristics and Phase Stability of
            Microtrons (Electron Cyclotrons)" by
            S.F. Singer

ONRL-22-52 "A New Theory of Supernovae" by S.F. Singer

ONRL-23-52 "New Developments in Nuclear Emulsions" by
            S.F. Singer

PERSONAL NEWS ITEMS

Dr. H.C. Longuet-Higgins, reader in theoretical
chemistry at Manchester University, is to succeed C.A.
Coulson as professor of theoretical physics at King's College,
University of London. He will assume his new duties on
1 October 1952. Before going to Manchester, Dr. Longuet-
Higgins spent a year at the University of Chicago, collaborating

with Professor Mulliken in the Physics Department there.

Professor Jacques Benoit of the University of Strasbourg has been appointed head of the Service d'Histo-physiologie, Station physiologique du College de France, 4 Avenue Gordon Bennett, Paris (16e). This appointment will provide Professor Benoit with facilities to continue and expand his studies in the field of reproductive physiology.

Professor A. Guinier, director of the Conservatoire des Arts et Métiers, Paris, was recently awarded the Walter Rosenhain Medal at the Annual General Meeting of the Institute of Metals held in London. The Medal is awarded annually for outstanding contributions in the field of physical metallurgy by persons under 45 years of age.

Prepared by the Scientific Staff
Submitted by Dr. S.R. Aspinall
    Deputy Scientific Director

PHILIP D. LOHMANN
Captain, USN
Assistant Naval Attache for Research

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